

## A Simple Lesson In Arc Flash Avoidance

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Most think of switchgear, motor control centers, high voltage motor starters, or similar equipment when they worry about arc flash accidents. However some more common electrical devices that are used throughout a typical plant can also be potential arc flash hazards.

For instance, industrial plugs and receptacles can be a source of electrical hazard. In particular, pin & sleeve and twist-type plug & receptacles are a concern. These devices are not intended to be disconnected or connected under load, and doing so can be hazardous. The contacts may vaporize and cause an arc flash if connected or disconnected in overload conditions. Because of the dangers of pin and sleeve or twist type connections, mechanically interlocked receptacles are used to help ensure that a plug is not removed while under load. Unfortunately, these devices are oftentimes defeated by the use of an extension cord which allows breaking of the plug and receptacle at the end of the extension cord while the other end is still inserted in the interlocked receptacle.



Workers must apply lockout/tagout devices to ensure an electrically safe work condition.

An alternative to standard plugs and receptacles are switch-rated plugs and receptacles, which provide a secure means of ensuring user safety. An integral switching mechanism ensures the plug is safely deenergized before it can be withdrawn from the receptacle. Additional safety features ensure that workers never have exposure to live parts during the operation of the device and thus a

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NFPA 70E defined hazard risk category equal to zero is maintained during connection and disconnection.

Another fix to the problem is to install a disconnect switch in line-of-sight of a pin and sleeve plug and receptacle. This switch can be used to safely disconnect power before the plug is connected. The disconnect switch should be turned off.

Verification that all blades of the disconnect are fully open is required in case the switch mechanism failed. Voltage testing to verify deenergization is also required. According to NFPA 70E voltage testing can be considered a hazard/risk category 2\* task and special PPE requirements apply.

### **Summary**

NFPA 70E is the primary standard used for electrical safety in the workplace. Plant personnel at both the management and worker levels need to be familiar with the standard. Once a thorough understanding of NFPA 70E is obtained, work practices as simple as plugging and unplugging a welder or motor driven machinery should be examined carefully. Oftentimes, what seemed like a perfectly safe thing to do is really not. Identifying the less obvious electrical hazards and fixing them before an accident occurs is usually the safest and least costly approach.

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